

LOCOMOTIVE SPECIFICATIONS

MODEL MP15

Electro-Motive Division
La Grange, Illinois



LOCOMOTIVE SPECIFICATIONS

**GENERAL MOTORS
MODEL MP15
1500 HP DIESEL-ELECTRIC
MULTI-PURPOSE LOCOMOTIVE**

**Electro-Motive Division
La Grange, Illinois**



Specification 8097-5
September, 1973

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SECTION 1

GENERAL INFORMATION AND IDENTIFICATION



MODEL	MP15 (Type 0440) 1500 H.P., Multi-Purpose Locomotive.	
ARRANGEMENT	The general arrangement of the locomotive is shown on Elevation and Floor Plan Drawing attached.	
NOMINAL DIMENSIONS	Track gauge	4' 8-1/2"
	Length over coupler pulling faces	47' 8"
	Width over side sills	10' 0"
	Maximum height above rail	15' 0"
	Width of operator's cab	10' 1/8"
	Width of power plant compartment	6' 0"
	Wheelbase — truck	9' 4"
	Truck centers	24' 2"
	Number of drivers	4 Pairs
	Diameter of drivers	40"
CAPACITY	Starting T.E. at	
	25% adhesion	62,500 lbs.
	30% adhesion	75,000 lbs.
WEIGHTS AND SUPPLIES	Total loaded weight on rails (approximately)	248,000 lbs.
	Fuel	1100 gal.
	Sand	30 cu. ft.
	Cooling water	230 gal.
	Lubricating oil	165 gal.
CLEARANCES	Locomotive outline drawing found in rear of specification book illustrates clearance conditions.	
SAFETY APPLIANCES	All steps, grab handles and other safety appliances cover EMD interpretation of Federal Railroad Administration requirements.	

SECTION 1

General Information And Identification



CURVE NEGOTIATION

Truck swing limits single unit curve negotiation to a 60° or 100 ft. radius curve.

Two units coupled are limited by footboard clearance to a 34° or 171 ft. radius curve.

Locomotive coupled to a 50 ft. car is limited by coupler swing to a 29° or 200 ft. radius curve.

SECTION 2

CARBODY CONSTRUCTION



FRAMING	Underframe is of all welded construction and serves as main carrying member for hood, cab and equipment. Draft gear pockets are welded to underframe structure.
UNDERFRAME CENTER BEARINGS	Welded to underframe.
COUPLERS	Type "E" of standard length with 6-1/4" x 8" shank and quadruple shear pin. Maximum swing of coupler is 12" each side of center. Centerline of coupler is 34" above rail.
UNCOUPLING DEVICE	Each end of the locomotive is provided with a top operating device arranged to operate from either side of the locomotive.
DRAFT GEAR	National Castings MS-485-6A rubber draft gear.
JACKING PADS	Four combination jacking pads and cable slings are provided, integral with the underframe opposite front and rear bolster.
PLATFORM STEPS	Steps are provided at each corner leading to locomotive platform.
FOOT BOARDS	Each end of the locomotive is provided with two footboards, hand railings, and grab irons.
CAB	The single operator's cab is of fabricated steel construction. Side windows for operator and helper are the sliding, double sash type, and are fitted with latches. Front and rear doors are provided.
WINDOWS	All windows and doors are provided with safety plate glass.
DOORS	A main center door is located at the rear of the cab, and a door at the front left side permits access to the walkway around the engine hood. Both doors are of fabricated steel construction.
DOOR LOCKS	The main cab door is equipped with a lock, and the front door is fitted with an inside latch.

SECTION 2

Carbody Construction



INSULATION

Ceiling is lined with perforated metal, backed up by insulation. Acoustic and thermal type insulation is added to front cab wall.

BATTERY BOX

An all steel box is mounted outside of the platform at the rear of the cab. Construction incorporates ventilation, and drainage. Batteries are easily accessible by means of hinged covers on the boxes.

HOOD

The power plant compartment has been designed to a minimum height and width to provide adequate vision from within the cab, as well as a runway around the hood. The sides are in effect made up of continuous double doors which permit complete accessibility to the power plant equipment by means of the walkway. The hood can be removed as an individual unit. A removable hatch is provided above the auxiliary generator.

ENGINE HATCHES

Hinged covers are located over the engine to facilitate inspection and removal of cylinder heads, liners, engine filters, pistons and other components.

HOOD DOORS

All side doors have outside hinges and latches.

LIFTING EYES

Provision is made for lifting eyes on hood and hatches to facilitate handling with a crane.

FILTERS

Disposable carbody air filters provided filtering air for main generator, air compressor and traction motors.

SECTION 3

TRUCKS



TRUCK ASSEMBLIES

Two interchangeable four-wheel flexible truck assemblies with swing bolster frame.

The frame is supported on equalizers, with triple coil springs between the equalizer and frame. Elliptic springs are located between bolster and spring plank.

Each of the four motors is supported by the driving axle to which it is geared and by a special flexible support on the truck transom which dampens the torque shocks of the motor.

AXLES

Axle material conforms to physical properties of current AAR specifications with journals to suit roller bearing boxes.

WHEELS

Cast or wrought steel, heat treated, 40" diameter wheels.

JOURNAL BOXES

Locomotive equipped with roller bearing journals. Journal box pedestal guides have spring steel wear plates.

PEDESTAL LINERS

Manganese steel bolted to frame.

PEDESTAL TIE BARS

Fitted and applied at the lower end of the pedestal legs and bolted into position.

TRUCK CENTER BEARING RECEPTACLE

Truck center bearing receptacle provided with wear plates and dust guard.

SIDE BEARINGS

Friction type side bearings.

INTERLOCKS

Body and truck interlocks provided each side of the center plate, serving as antiswing device in case of derailment.

TRUCK BRAKES

Clasp brake rigging provided on each wheel, operated by individual brake cylinders.

BRAKE PINS

All pins and bushings hardened and ground, large size. All holes in brake rigging bushed.

HAND BRAKE

Hand brake provided for the locomotive connected to one brake cylinder lever only. All trucks provided with lever for hand brake connection, making trucks interchangeable.

SECTION 4

POWER PLANT AND TRANSMISSION



ENGINE	G.M. Diesel twelve cylinder, 2 cycle 45° V, 9-1/16" bore, 10" stroke, unit injection, Roots blower scavenging through cylinder wall intake, and multi-valve exhaust. Water cooled cylinder liners and heads, oil cooled pistons, seven bearing crankshaft, drop forged connecting rods and floating piston assembly. Isochronous governor speed control and separate overspeed trip and high crankcase pressure protection. Engine shipped without lubricating oil.
MAIN GENERATOR	EMD forced ventilated, nominal 600 volt direct current generator. Single outboard bearing armature, direct connection to engine crankshaft through a flexible coupling. Capacity suitable to continuously transmit to traction motors the rated output of the engine under all conditions for which the locomotive is offered.
LOCOMOTIVE CONTROL	Locomotive motor connection is permanent Series-Parallel.
LOAD CONTROL	Load control provided to automatically maintain horsepower output in accordance with the published tractive effort characteristics of the locomotive.
TRACTION MOTORS	Four direct current, series wound, forced ventilated, axle hung motors with roller type armature bearings.
TRACTION MOTOR BLOWER	Single traction motor blower driven from engine provides air for all traction motors.
AUXILIARY GENERATOR	Direct current generator, driven from engine gear train, provides current for control circuits, lighting, battery charging, and separate excitation of main generator. Voltage automatically controlled by static voltage regulator.
ENGINE STARTING	By motoring of the main generator through use of special starting field energized by the locomotive storage battery. Engine start switch at governor end of engine.
STORAGE BATTERY	32 cell, 64 volt, 284 ampere hour (8 hour rating) battery located back of cab.

SECTION 4

Power Plant And Transmission



ENGINE COOLING

Circulation system consists of direct driven centrifugal water pump; forced air circulation through fin tube radiators, and separate water supply tank. Temperature control by automatically operated shutters.

ENGINE LUBRICATION

The engine lubricating oil system is a pressure system using two positive displacement gear type pumps combined in a single unit. One pump delivers oil for the pressure lubricating system, the other for piston cooling. The oil supply to these pumps is drawn from the oil strainer chamber through a common suction pipe.

A scavenging oil pump is used to draw oil from the engine oil pan through a strainer, pump it through the lube oil filter to the cooler core section of the cooler tank and return it to the strainer chamber. Low oil pressure and high oil temperature protection are provided resulting in engine shutdown.

ENGINE EXHAUST

EMD spark arrestor manifold including carbon retention traps.

ENGINE FUEL SYSTEM

Return flow, single DC motor driven gear pump, protected by suction strainer, and increased capacity discharge filters to insure clean fuel for the engine. Sight glasses permit visual inspection of fuel flow, and relief valve offers protection against excessive pressures.

FUEL TANK

1100 gallon capacity fuel tank built of heavy gauge steel, with baffle plates, located underneath the locomotive body. One filling station on each side. Tank equipped with venting, cleanout plug and nonremovable water drain.

Direct reading type fuel sight glasses with gallonage calibration plates on both sides of tank. Each filling station provided with electric emergency fuel cutoff actuating button. Similar pushbutton located in cab. When operated, engine stops immediately.

ENGINEER'S CONTROL STATION

Engineer's control station located conveniently to the left of the engineer's seat, includes the engine speed throttle, and locomotive reverse lever. Automatic and independent brake valves. The lever arrangements are such that the throttle must be in idle before the reverse lever can be removed to isolate the controller. The horn, bell and independent sander valves are also located in the control stand.

ENGINEER'S CONTROL SWITCHES

Control and lighting switches are located within reach of the engineer including switches for control and fuel pump, generator field, engine run, gauge lights, headlight "bright" front and rear and "dim" front and rear. Cab heater switches are located on cab heaters, providing individual control.

SECTION 4

Power Plant And Transmission



ENGINEER'S INSTRUMENT PANEL

A lighted instrument panel is provided on top of engineer's controller containing 4½" air brake gauges. Hot engine indicator, ground relay light and reset button are located on the front cab wall.

TRUCK CUTOUT

A switch is provided to cutout the traction motors by truck.

ELECTRICAL CONTROL CABINET

Cabinet located beneath cab floor accessible from side of locomotive, houses the locomotive control equipment. Fuse and battery switch panel located in cab.

SECTION 5

AIR BRAKES



AIR BRAKES	26NL brake schedule including self-lapping automatic and independent brake valves and 6NR distributing valve.
FOUNDATION BRAKES	Individual brake cylinders operate clasp brakes on each wheel.
MAIN RESERVOIR	Two 15" diameter x 152" steel reservoirs mounted beneath the underframe. Total capacity: 49,000 cu. in. Manual main reservoir drain valves provided. Reservoirs drilled with tell tale holes.
AIR COMPRESSOR	<p>One two stage, three cylinder, water cooled direct coupled compressor, having a displacement of 254 cu. ft. per minute at 900 RPM. Compressor is provided with large oil capacity and disposable intake air filter.</p> <p>Electric air compressor governor adjusted to maintain reservoir pressure between 130 and 140 psi.</p>
SANDING	Manual sanding is controlled pneumatically. One sander valve operates eight sand traps, four traps for forward movement and four traps for reverse movement.

SECTION 6

EQUIPMENT



CAB HEATER	Two forced air electric cab heaters and two side wall mounted convection type strip heaters provide a total of 8.6 KW capacity.
WINDOW WIPERS	Total of four air operated window wipers are provided for front and rear windows on both sides of cab and center windshields.
SUN VISORS	Total of four adjustable metal sun visors are provided.
CAB SEATS	The two wall mounted upholstered cab seats have forward and backward as well as height adjustments. Both seats can be turned 180 degrees.
FIRE EXTINGUISHERS	Two 20 lb. Ansul dry powder extinguishers are provided, one located in cab, the other in the engine compartment.
HEADLIGHT	Twin sealed-beam headlights, front and rear, are equipped with two 200 watt, 30 volt sealed beam units. Bright and dim switch for each light provided in operator's cab.
WARNING DEVICES	Consist of: <ol style="list-style-type: none">1. One 12" bell operated by internal pneumatic type ringer.2. One diaphragm type air horn.
LOCOMOTIVE LIGHTING	Lights and outlets are as follows: <ol style="list-style-type: none">1. Two ceiling cab lights2. One engine room light3. Two ground lights4. Four number lights5. Three gauge lights6. Two outlet receptacles, one in cab, one in engine room.
MARKER AND FLAG BRACKETS	Four standard combination flag and light brackets are provided, two each are located at front and rear of locomotive.
NUMBER BOXES	Four lighted number boxes, two on each end of locomotive, mounted at an angle for both forward and side visibility. Numbers are painted on glass windows and are not removable.

SECTION 7

LOCOMOTIVE MODIFICATIONS



The following modifications can be supplied on request to satisfy various operating requirements. The base price of the locomotive described in this specification does not include these modifications.

MULTIPLE CONTROL	Multiple control equipment available to allow operation of two or more units from one cab. Locomotive equipped with one 27 point power plant receptacle per end, and one power plant jumper cable. Sanding control can be trainlined electrically, pneumatically or both.
AIR COMPRESSOR	Two stage, six cylinder air compressor, water cooled, having a displacement of 401 cu. ft. per minute at 900 RPM.
AWNINGS	Cloth or metal awnings over cab windows can be provided.
WIND DEFLECTORS	Wind deflectors can be provided at front and rear of side windows.
SPEED RECORDER	Speed recorder or speed indicator available with splined axle drive.
BATTERY CHARGING RECEPTACLE	Battery charging receptacle can be provided.
PUSH POLE POCKETS	Push pole pockets can be provided at both ends.
DEEP SUMP OIL PAN	Increased capacity engine oil.
DUAL CONTROL	Mechanically connected dual control stations available.
P.C. SWITCH	A pneumatic control (P.C.) switch may be provided to reduce the power output of the locomotive during safety control or emergency air brake application.

SECTION 7

Locomotive Modifications



MOTOR SHUNTING	Traction motor field shunting to extend speed range over which full horsepower is available.
LOAD INDICATING AMMETER	A load indicating ammeter can be provided in the control stand.
LAYOVER PROTECTION	Layover protection available using oil fired hot water heater or electric immersion heating element.
BALLAST	Locomotive can be ballasted to weigh 266,000 lbs. maximum within manufacturing tolerances.
TOILET	Toilet of incinerating, chemical recirculating, or flush-treatment type is available.
CLASSIFICATION LIGHTS	Classification lights built into each corner of the hood at the front of the locomotive and each corner of the rear of the cab are available.
HANDRAILS	Underframe mounted handrails are available.

SECTION 8

PAINTING



OUTSIDE FINISH	Color arrangement and design to agree with railroad's requirement.
ENGINE ROOM	Inside finished in suede gray. All air, fuel, water and lube oil piping color coded at points of connection.
UNDER CARRIAGE	Black unless otherwise specified.
CAB	Inside finished in suede gray.
TRUCKS & TANKS	Black unless otherwise specified.

SECTION 9

PERFORMANCE DATA



OPERATING RANGE

With the standard 74:18 gear ratio, the locomotive develops 46,800 lbs. of tractive effort at the minimum continuous speed of 9.3 mph. The maximum recommended operating speed is 70 mph.

HORSEPOWER RATING

The MP15 locomotive develops 1500 nominal horsepower into the generator for traction at an engine speed of 900 rpm under the following conditions:

- 60°F air intake temperature
- 29.9 inches hg barometer (minimum)
- 0.845 specific gravity fuel
- .83 engine governor rack setting
- 60°F fuel temperature

SECTION 10

REMANUFACTURED CONTENT



REMANUFACTURED MATERIAL

Complete RS3 truck assemblies, including 752 motors, are completely remanufactured and renewed, and comprise the entire remanufactured content in locomotives constructed in accordance with Specification 8097-5.

The rebuilt and qualified truck-and-motor assemblies are furnished painted and ready for operation.

NEW MATERIAL

The listing below identifies the minimum amount of new material incorporated into the two truck and motor assemblies.

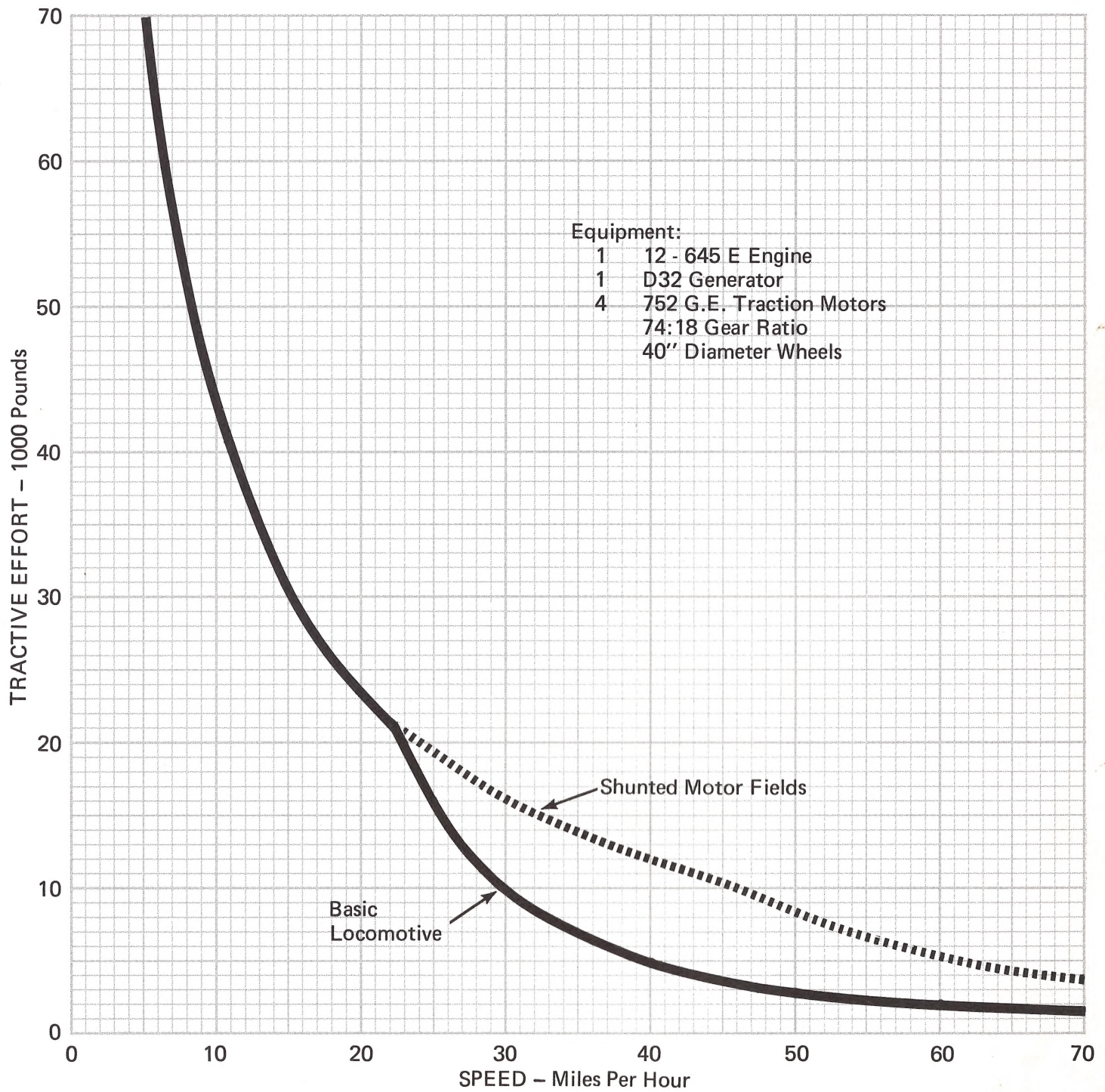
a. Truck

- Elliptic springs 8326824
- Coil springs 8330564
- Traction motor air bellows
- 40" diameter wheels
- Brake rigging pins and bushings
- Swing hanger pins and bushings
- Brake shoes
- Pedestal liners
- Center bearing horizontal wear plate
- Center bearing vertical wear ring
- Journal box wear plates
- Side bearing wear plates
- Truck frame and bolster driving face wear liners
- Motor nose suspension
- Axle gears

b. Motor

- Armature windings
- Armature bearings
- Support bearings
- Wick lubricators
- Gear case seals
- Carbon brushes
- Pinion

SPEED -- TRACTIVE EFFORT
1500 HP Model MP15 Locomotive

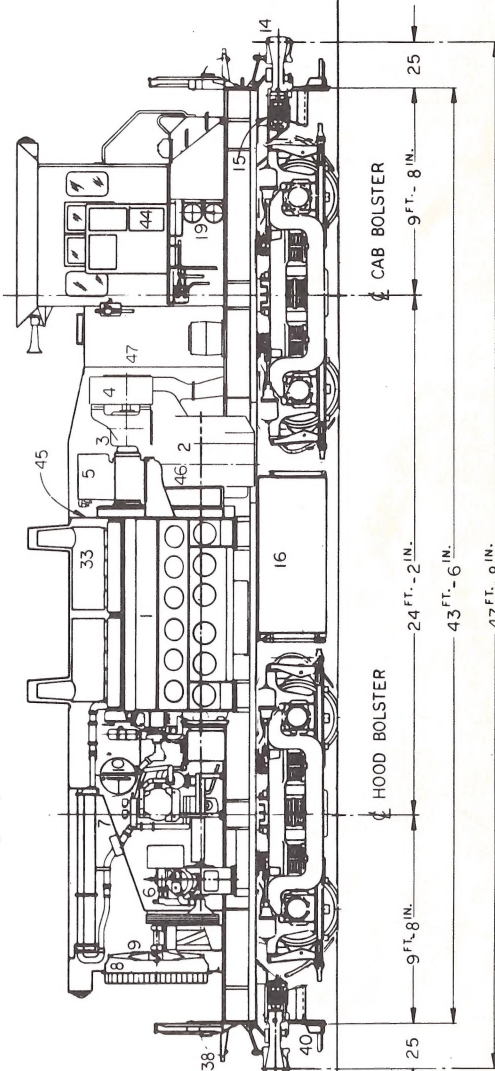
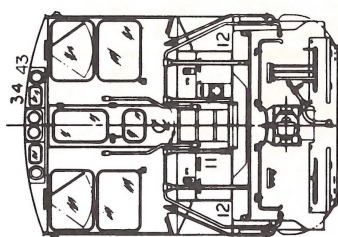
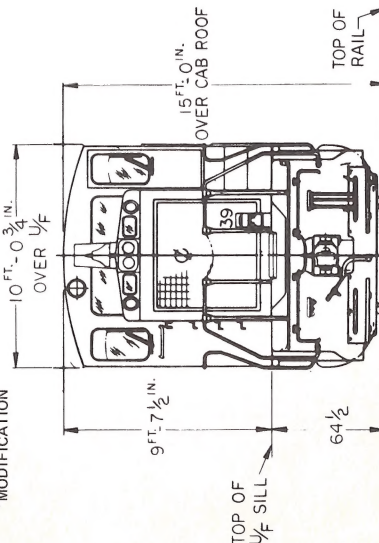
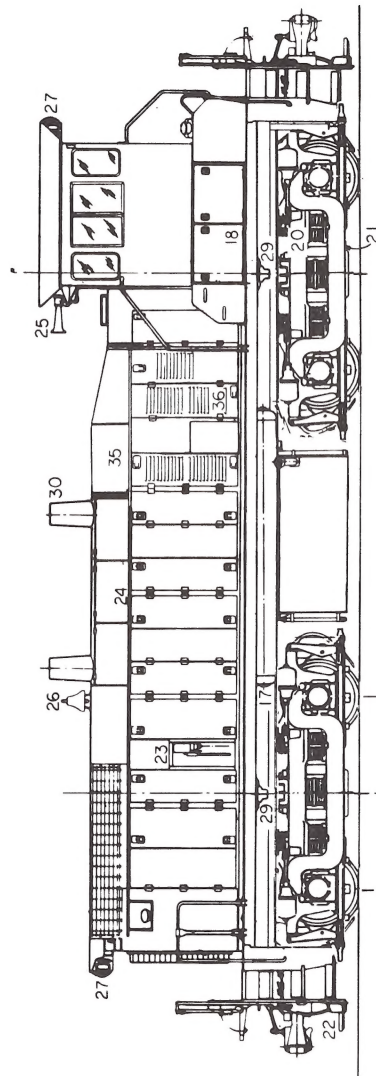
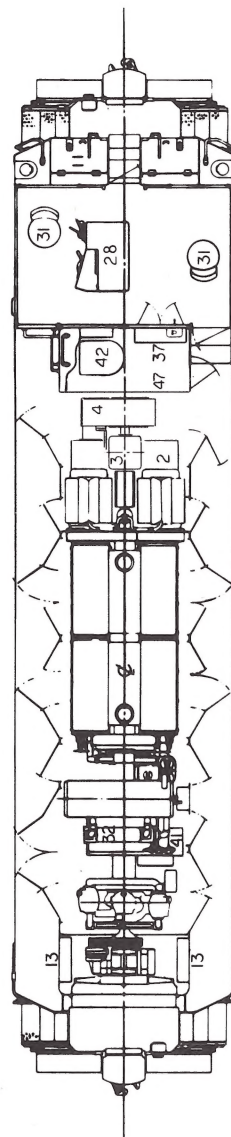


MODEL MP15 - 1500 HP MULTI-PURPOSE LOCOMOTIVE

LEGEND

1. ENGINE 12-645E
2. MAIN GENERATOR D-32
3. AUXILIARY GENERATOR
4. TRACTION MOTOR - GENERATOR BLOWER
5. ENGINE AIR FILTERS
6. AIR COMPRESSOR - WBO
7. RADIATORS
8. COOLING AIR INLET SHUTTERS
9. COOLING FAN
10. ENGINE WATER TANK
11. BATTERIES - MS 280
12. SAND BOX - CAB END 15 CU. FT.
13. SAND BOX - HOOD END 15 CU. FT.
14. COUPLER - TYPE E
15. DRAFT GEAR MS 485-6A
16. FUEL TANK
17. MAIN AIR RESERVOIRS
18. ELECTRICAL CONTROL CABINET
19. AIR BRAKE EQUIPMENT
20. TRUCK - AAR TYPE B
21. TRACTION MOTOR
22. FOOTBOARDS
23. HANDBRAKE
24. HOOD MOUNTED HANDRAILS
25. HORN
26. BELL
27. HEADLIGHT
28. ENGINEER'S CONTROL STAND
29. JACKING PADS
30. EXHAUST STACK
31. CAB SEAT
32. LUBE OIL COOLER
33. SPARK ARRESTER MANIFOLD
34. NUMBER BOX
35. ENG. FILTER ACCESS DOORS
36. CARBODY AIR FILTERS
37. ELECTRICAL CONTROL PANEL
38. M.U. END ARRANGEMENT
39. M.U. RECEPTACLE
40. PILOT
41. LOAD REGULATOR
42. TOILET
43. CLASS LIGHT
44. ELECTRIC CAB HEAT
45. FULL PARTITION
46. GENERATOR PARTITION
47. TOILET PARTITION

* MODIFICATION



NOTE:
LOCOMOTIVE HEIGHT TOLERANCE = $\pm 1/2$ IN.
LOCOMOTIVE WIDTH TOLERANCE = $\pm 1/2$ IN.
TRUCK LATERAL AT BOLSTERS = $1/2$ IN.
LOCOMOTIVE IS SHOWN INCLUDING HALF VARIABLE
SUPPLIES AND IN NEW CONDITION, STANDING STILL
ON LEVEL AND TANGENT TRACK.

